

ANNEX

MINIMUM SAFETY STANDARDS FOR SHIPS CARRYING MIXTURES THE BENZENE CONTENT OF WHICH IS 0.5 PER CENT OR MORE

Chronic exposure to very low concentrations of benzene vapours in air of the order of a few parts per million may cause leukaemia. In order to protect the health of seafarers to the same level as that of shore-based workers performing comparable tasks, measures should be taken for all ships carrying mixtures the benzene content of which is 0.5 per cent or more. Such measures should include the following requirements:

1 **Controlled tank venting system**

Vapours displaced from the tank during loading and tank breathing should be emitted through a controlled tank venting system complying with either Regulation II-2/59 of SOLAS 74 or paragraph 8.3.2 of the IBC Code, or paragraph 2.14.2 of the BCH Code, as applicable.

Whenever a vapour emission control system is available ashore, vapours displaced from the tank during loading should be returned to that system.

2 **Air quality monitoring**

The airborne concentration of benzene vapour should be measured with an approved instrument by a trained and properly protected person, before any other person is authorized to work in a given area.

As an alternative, a programme of sampling and measurements should be carried out covering all representative circumstances which may be found during cargo operations and a record kept of such programme.

3 **Operational exposure limits**

Worker exposure to airborne concentrations of benzene vapours should be controlled within the following limits:

- .1 a Time Weighted Average (TWA) of one part of benzene per million parts of air, over an eight hour period, which covers the time a man is assumed to work in any 24 hour period.
- .2 a Short Term Exposure Limit (STEL) of five parts of benzene per million parts of air over any 15 minute period.

4 **Personal protection equipment (PPE)**

.1 Equipment for cargo operations on deck

Whenever direct or representative measurements indicate that the TWA or the STEL are

exceeded during normal cargo handling operations¹, personnel required to work in the affected area should wear appropriate respiratory equipment. Such equipment is indicated below², however a higher level of protection may be selected by the user.

- .1 **Half face piece:** in areas where the airborne concentration of benzene vapours exceeds 1 ppm but is less than 10 ppm;
- .2 **Full face (filter) piece with dual cartridge:** operations other than emergency response, spill response and clean-up, in areas where the airborne concentration of benzene vapours exceeds 10 ppm but is less than 50 ppm;
- .3 **Air supplied respirators:** operations in areas where the airborne concentration of benzene vapours exceeds 50 ppm but is less than 100 ppm;
- .4 **Pressure demand breathing apparatus:** in areas where the airborne concentration of benzene is greater than 100 ppm or unknown; and
- .5 **Eye protection, impervious gloves and suitable protective apron** should be readily available to personnel while making or breaking cargo transfer connections, sampling and gauging or when skin contact with the cargo is likely.

.2 **Equipment for entry into enclosed spaces when gas is present**

Ships carrying mixtures the benzene content of which is 0.5 per cent or more should carry not less than three complete sets of safety equipment each permitting personnel to enter a gas filled compartment and perform work there for at least twenty minutes. Entry must always be subject to adequate pre-entry criteria being satisfactorily complied with.

Such equipment should be in addition to what is required by regulation II-2/17 of SOLAS 74.

One complete set of safety equipment should consist of:

- .1 one self-contained air-breathing apparatus (not using stored oxygen);

¹ These recommendations regarding air purifying masks apply to operational uses of respiratory equipment for the purposes of protection during normal cargo handling operations and are not to be confused with those provisions specified in 14.2.8 of the IBC Code.

² There are existing standards for respiratory protection equipment. These standards include:

- American National Standard for Respiratory Protection (ANSI Z88.2 - 1992)
- British Standard for Respiratory Protection Devices, Valved Filtering Half Masks to Protect Against Gases or Gases and Particles (BS EN 405: 1993)

- .2 protective clothing, boots, gloves and tight-fitting goggles;
- .3 fire-proof life line with belt resistant to the cargoes carried; and
- .4 explosion-proof lamps.

Such ships should also comply with regulation 14.2.3 of the IBC Code.

5 PPE Maintenance

The personal protection equipment should be maintained and replaced in accordance with manufacturers' instructions. Maintenance records should be kept on board.

6 Training

Each respirator wearer shall be given training (and retraining), which shall include explanations and discussions of:

- .1 the respiratory hazard and the effect on the wearer if the respirator is not used properly;
- .2 the engineering and administrative controls being used and the need for respirators to provide protection;
- .3 the reason for selecting a particular type of respirator;
- .4 the function, capabilities, and limitations of the selected respirator; and
- .5 the method of donning the respirator and checking its fit and operation.

7 Medical Monitoring

Ship personnel potentially exposed to benzene vapour inhalation should be submitted to a programme of regular suitable medical checks on their health. The results of such checks should be kept on record under normal confidential practices in the medical profession.

8 Information on the benzene content of cargo

Prior to loading, the shipper should inform the master in writing if the cargo to be loaded contains 0.5 or more percent benzene.

In order to comply with this requirement, the shipper might have to obtain this information from the cargo manufacturer.

ANNEX

CARGOES THAT MAY CONTAIN BENZENE

This table lists a number of cargoes, normally transported in oil tankers, which may contain benzene in concentrations greater than 0.5%.

Gasoline Blending Stocks, Reformates
Gasoline, Automotive
Gas oil (Cracked)
Unleaded Gasoline
Gasoline, Aviation
Gasoline, Straight Run
Naphtha, Cracking Fraction
Naphtha, Petroleum
Naphtha, Solvent
Naphtha, Stoddard Solvent
Naphtha, Varnish Makers & Painters (75%)
Oil, Coal Tar
Oil, Crude

Notes

- 1 This list is not exhaustive. Therefore cargoes not listed above may contain benzene in excess of 0.5%.
- 2 There are specific products included in some of the above generic entries which contain less than 0.5% benzene, e.g. crude oil. For such products, the circular would not be applicable.
